Three-Dimension Landslide Model In Digital Landslide Technique

Abstract

Landslide is a kind of dynamical geological phenomena caused by the gravity. The distribution of landslides in China is widely distributed, high quantity and large scale.Not only can landslide hazards lead to massive economical loss, but also cause severe casualty, which is harmful to geological environment and human engineering-economical activities. Conventional study methods can not be effectively applied in a large scope of landslide investigations, and landslide research is now mainly worked on two-dimension. For many years, lots of geologists have been working on how to vividly describe landslide and its environment in three dimensional. Digital landslide technique is regarded as one of most effective and advanced methods. It is a kind of GIS technique that managing and applying three-dimensional, geo-referenced and multi-thematic landslide models based on geological principles, using the data from Remote Sensing (RS) and Globe Positioning System (GPS). Three-dimensional landslide Technique is one of important subjects in digital landslide Technique.

Main contents of the paper are as follows: (1) research of Landslide using remote sensing and data management technique. (2)Extracting DEM from remote sensing data using digital photogrammetry. (3)Three-dimension data structure analysis. (4)Three-dimension visualizing technique including color model, illumination and hiding, multi-resolution display etc. (5)Discussing on engineer application and analysis methods based on three-dimensional landslide model, such as coordinates query, distance measurement, area and volume calculation, profile intercepting and other applications. (6)Build the three-dimensional landslide model of Yigong landslide in Tibet. Discuss the research methods of three-dimensional landslide using satellite remote sensing data. Some engineer applications based on 3D landslide model are given. (7)3D landslide model of Jinglong Mountain landslide in Ertan reservoir is also built. Base on aerial data, DEM is extracted. Combined with geological data and in site investigation, the 3D model is built.

All these research show that the study of three-dimensional landslide model based on remote sensing are feasible. The processed remote sensing data can not only be used to express the status of terrain, but also be applied to get DEM using digital photogrammetry method. These data, combining with geological data, can be used to build 3D landslide model, and the 3D model expanded the study to three dimensions. Three dimensional landslide model will be great helpful for landslide stability analysis and engineering treatment.

Key words: Digital Landslide, remote sensing, DEM, three dimensional landslide model